3.0 Affected Environment and Environmental Consequences

Chapter Preview

3.1 VEGETATION

3.1.1 Methodology

Vegetative information used was obtained from aerial photos, stand exam surveys, field visits, and stocking surveys. Stand boundaries are delineated using aerial photos, and stand level information for pole-size and larger stands is obtained through stand exam surveys.

Stand information greater than fifteen years old was re-inventoried across the project area in 2002 and early 2003. This includes most stands on the Bergland District that are pole-size or larger. Stands diagnosed for treatment at the time of the survey were field reviewed by one or more members of the ID Team.

Assumptions that were used in the vegetation analysis include:

Aspen

The Forest Plan recommends harvest at 40-90 (average 64) years for existing aspen and 40-70 (average 54) years for regenerated aspen (Forest Plan, page IV-67). Research in northern Minnesota shows the pathological rotation age for aspen is about 55 to 60 years and even shorter in southern Wisconsin and Michigan (Burns and Honkala 1990). Research in Wisconsin found that aspen stands rapidly deteriorate after age 50-60 (USDA 1998). In the Lake States, aspen stands older than 40 years are subject to breakup due to white trunk rot (*Phellinus tremulae*) decay. Breakup refers to the physical loss of trees in the stand through loss of wood fiber due to decay and stem breakage during windstorms due to weakening of the stems by decay (Anderson and Schipper 1978).

Although there is discrepancy among various researchers regarding the rotation age of aspen, 50 years was used for a rotation age.

Temporary Openings

The assumption used in calculating created openings was that stands would no longer be considered an opening five years after clearcut harvest because the regeneration should have reached a height greater than 20% the height of the adjacent stands. This is because surveys of similar stands in the area that have been clearcut are greater than 14 feet tall (20% of a 70-foot mature aspen stand) at five years of age.

Because commercial timber sales for this project would not be offered until 2004, the earliest that clearcutting would occur in the project area would likely be 2005. Therefore, any stands clearcut in 1999 or prior were no longer considered to be an opening, and stands clearcut after 1999 were assumed to still be an opening.

This assumption was based on site index curves, stocking surveys from past harvest, and general knowledge of aspen growth.

3.1.1.1 Measurement Indicators

The measurements associated with issues related to vegetation are:

Aspen management

- Acres of treatment proposed to maintain or convert to aspen type;
- Percentage of aspen type in MA 1.1 of the project area and Forestwide after treatment;
- Long-term percentage of aspen type in MA 1.1 of the project area and Forestwide *(%)* due to loss of aspen type on unsuitable ground
- Acres of aspen type converted to other forest type;
- Age class distribution of aspen type after treatment.

Softwood management

- Acres proposed for conversion to softwood by conifer planting;
- Acres proposed for conversion to a softwood pulpwood forest type;
- Net increase in softwood;
- Percentage of softwood type in MA 1.1 of the project area and Forestwide (%) after treatment.

Temporary openings

- Number and size range of temporary openings exceeding 40 acres.

3.1.2 Vegetation in the Affected Environment

(See Wild and Scenic Rivers, Section 2.10 for discussion on MA 8.1 and MA 9.2.)

MA 1.1

The Baltimore project area encompasses approximately 35% of the forested land base and 41% (17,650 acres) of the aspen cover types in MA 1.1 Forestwide. Within the MA 1.1 portion of the project area, the aspen types comprise 71% of all forested land. The remaining types include hardwood (20%) and softwoods such as northern white cedar, hemlock, white pine, mixed swamp conifers, and spruce or balsam fir (9%).

Aspen

The aspen forest types are dominated by aspen with varying amounts of other species, mainly balsam fir, spruce, black ash, and red maple. The age class distribution of aspen is bimodal, with a disproportionate amount in both the younger and older age classes as illustrated in Figure 3.1.1. Forty-four percent of the aspen is greater than 60 years old, and more than half of this is greater than 70 years old. Only 2% of the aspen is from 30 to 59 years old, and the remainder (54%) is from 0 to 29 years old.

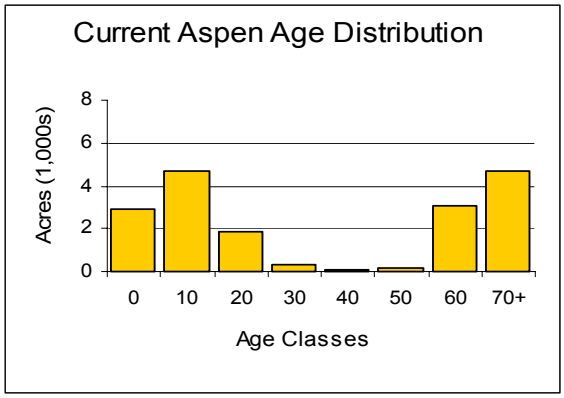


Figure 3.1.1. Current Aspen Age Distribution in MA 1.1 of the Project Area.

The goal is to have the aspen distributed more evenly over all age classes, with fewer trees greater than 70 years old (average rotation age for aspen is 54-64 years with a maximum age of 70-90 years, Forest Plan IV-67). Presently, there is a need to regenerate some of the mature aspen and to harvest at a more consistent rate in the future.

Hardwoods

The hardwood stands are dominated by red and sugar maple and have varying amounts of basswood, yellow and white birch, red oak, white and black ash, ironwood, and hemlock. Using past treatment as an indication of hardwood management in the project area, the percentages are 28% uneven-aged and 72% even-aged. Some of this even-aged treatment

(10%) has been to convert hardwood to aspen type.

The age class distribution of hardwoods is less meaningful as uneven-aged stands are all-aged and are not included in the distribution. Therefore, Figure 3.1.2 only represents the even-aged hardwood stands in the project area. The even-aged hardwoods have a fairly regular distribution with the majority centered from 60 to 89 years old. This age class is approximately 76% of the even-aged hardwood stands, with 4% less than 59 years old and 20% greater than 90 years old.

Figure 3.1.2. Current Hardwood Age Distribution in MA 1.1 of the Project Area.

The goal is to have the even-aged hardwoods distributed more evenly over all age classes, with fewer trees greater than 130 years old (average rotation age for hardwood is 96-124 years with a maximum age of 130-180 years, Forest Plan IV-71). Overall, most of the even-age hardwood stands are still relatively young for regeneration. Intermediate treatments are most needed to increase the growth and vigor of potential seed trees for regeneration cuts in the future.

Softwood

The softwood stands are primarily balsam fir/spruce/aspen, white spruce, cedar, and white pine, with scattered stands of hemlock, red pine, and black spruce. The age class distribution of softwood is irregular, but softwood acres gradually increase with age. This might be expected since the prominent softwood types in the project area are long-lived conifers.

As depicted in Figure 3.1.3, a large portion of the softwoods (73%) are greater than 60 years old, while twenty-three percent of the remaining softwoods are from 30 to 59 years old, and only 4% is from 0 to 29 years old.

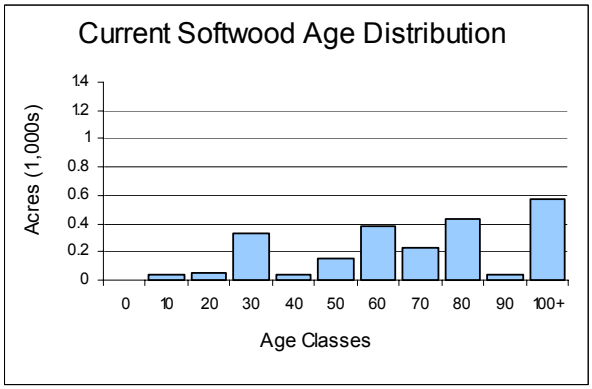


Figure 3.1.3. Current Softwood Age Distribution in MA 1.1 of the Project Area.

The goal for softwoods is harder to define as the rotation age for softwoods varies among species. The lowest average rotation age is 68 years (balsam fir), while the highest is 184 years (hemlock), and the average rotation age of 90-137 years covers the other species (Forest Plan, page IV-73-86). Ideally, you would expect a fairly even increase in acres of softwood with age for the amount of long-lived conifers in the project area. However, the amount of regeneration is a little less than expected and gaps in the size classes are present. Overall, the distribution is relatively within the goals for softwood, but some regeneration of softwoods may be helpful.

MA 9.3

The extent of MA 9.3 in the Baltimore project area is 298 acres of Forest System lands (274 acres are forested), which is approximately 1% of the project area. This area is located adjacent to the Ontonagon River Bridge on U.S. Highway 45 (Military Hill). Much of this area is visible from the highway, and is characterized by steep side slopes and heavy clay soils.

The majority of MA 9.3 in the project area is dominated by mixed hardwoods (66%), with lesser amounts of aspen (26%). The remainder is brush and openings (8%).

The purpose of MA 9.3 is to protect and maintain environmental values, with little or no vegetation manipulation or development.

3.1.2.1 Area of Potential Effect

This evaluation and analysis of vegetation was conducted at the project area level and the management areas it contains. The project area is the scale that would be immediately impacted by implementation of any alternative evaluated and analyzed for this project.

3.1.3 Direct, Indirect, and Cumulative Effects on Vegetation

The tables below give an overview and comparison of the effects on the measurement indicators and resulting vegetative composition for all alternatives in regard to MA 1.1 of the project area.

Table 3.1.1. Comparison of All Alternatives on Measurement Indicators for the Issues.

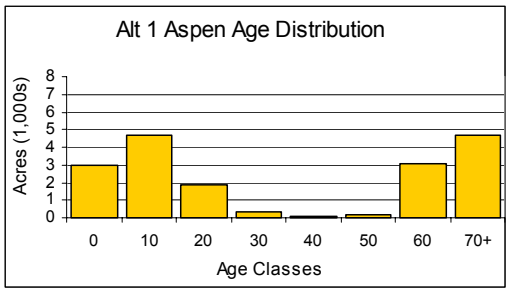
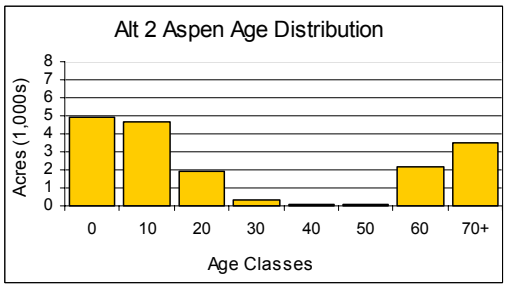
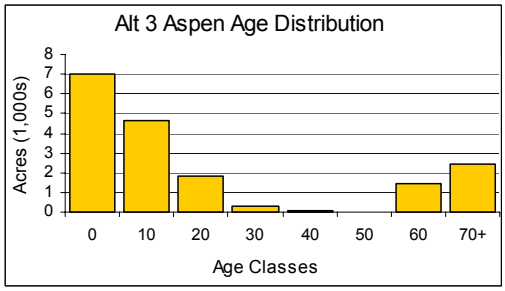
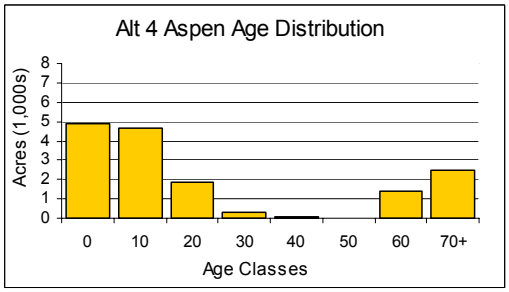
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Aspen Management				
Acres of treatment proposed to maintain or convert to aspen type	0	1,885	3,710	2,010
Percentage of aspen type in MA 1.1 of the project area and Forestwide *(%)* after treatment	72% *(57%)*	71% *(57%)*	72% *(57%)*	65% *(55%)*
Long-term percentage of aspen type in MA 1.1 of the project area and Forestwide *(%)* due to loss of aspen type on unsuitable ground	61% *(53%)*	60% *(53%)*	61% *(54%)*	54% *(51%)*
Acres of aspen converted to other forest type	0	230	120	1,715
Age class distribution of aspen after treatment:				

Table 3.1.1. Comparison of All Alternatives on Measurement Indicators for the Issues *(continued)*.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Balance of Softwood Component				
Acres proposed for conversion to softwood by conifer planting	0	290	85	540
Acres proposed for conversion to a softwood pulpwood forest type *Net increase in softwood forest type*	0 *0*	0 *180*	55 *50*	805 *1,305*
Percentage of softwood type in MA 1.1 of the project area and Forestwide *(%)* after treatment	Saw 3% Pulp 6% *(Saw 10%)* *(Pulp 13%)*	Saw 4% Pulp 6% *(Saw 11%)* *(Pulp 12%)*	Saw 3% Pulp 6% *(Saw 11%)* *(Pulp 12%)*	Saw 5% Pulp 9% *(Saw 11%)* *(Pulp 13%)*
Temporary Openings Exceeding 40 Acres				
Number of temporary openings exceeding 40 acres Size range of openings *Average opening size*	0	15 50-175 acres *105 acres*	28 41-324 acres *110 acres*	0

Table 3.1.2. Resulting Vegetative Composition of All Alternatives.

Vegetative Composition - MA 1.1- Forested Lands							
Vegetation Type	**Forest Product**	**DFC % Forested Land**	**Forestwide Existing Conditions June 2003 CDS Data**	**Existing Baltimore Project Area Alternative 1**	**Baltimore Project Area Immediately After Treatment**		
					Alternative 2	**Alternative 3**	**Alternative 4**
Aspen	Saw/Pulp	40%-60%	57%	72%	71%	72%	65%
Softwood	Saw	5%-10%	10%	3%	4%	3%	5%
	Pulp	10%-20%	13%	6%	6%	6%	9%
Hardwood	Saw/Pulp	5%-20%	20%	20%	19%	19%	21%

3.1.3.1 Direct/Indirect Effects on Vegetation of Alternative 1

Under this alternative no action would be taken. There would be no harvesting of any forest type and no project work would be conducted for enhancing resource conditions.

MA 1.1

No stands would be treated or converted to other forest types through silvicultural treatment, therefore, current trends would continue. The density of trees on the site would continue to increase. Regeneration would occur where there is mortality, but generally would be light.

Intolerant and mid-tolerant species would continue to decline in the smaller size classes due to suppression from the overstory trees. Over time growth rates and vigor would decline, and mortality would increase and the stands would move toward species that are tolerant of growing in the shade like sugar maple and balsam fir. Stand structure would move towards larger trees, with seedlings and saplings being reduced. Stands where mortality is occurring would continue to lose trees until most of the shorter lived species are removed from the stand. In the long term, there would be less tree species diversity in the hardwood stands.

Because there is no cutting with this alternative, no created openings would occur. The existing upland openings would continue to slowly fill in with trees and shrubs because no maintenance would occur.

Under this alternative the current stands classified as old growth would retain such classification. Other stands in all forest types would be expected to develop old growth characteristics over time, barring any natural disturbance resulting in successional setbacks.

Aspen

Existing aspen forest types would continue to decline and progress toward conifer or hardwood due to natural processes and succession. Regardless of the chosen alternative, the amount of aspen on unsuitable ground for timber production that would be lost in the long-term (20+ years) is approximately 2,670 acres. These acres would not be treated in the foreseeable future and this loss of aspen to other forest types is predictable without natural disturbance of sufficient size to regenerate aspen. As a result, the aspen percentage of forested land in MA1.1 of the project area under Alternative 1 would naturally be reduced from 72% to 61% over the long-term.

The mid-term (10-20 years) effect, or at least until the next entry, of not treating any aspen on suitable ground would also be a gradual conversion of mature aspen stands to either conifer or hardwood types. At that time treatment for aspen regeneration may be possible, but the effort and money required would be considerable.

In the short-term (0-10 years) the effect would be less, but as each year passes it becomes harder to revert back to aspen without using measures similar to what created these stands.

A disproportionate amount of aspen is near or beyond the pathological rotation age (age at which insect or disease losses offset any additional gains in volume). In northern Minnesota, the pathological rotation is about 55 to 60 years and even shorter in southern Wisconsin and Michigan (Burns and Honkala 1990). In a short time much of the mature aspen may be too decadent for economical harvest. Because trees continue to increase in diameter while decay is destroying additional wood fiber, an indirect effect of not regenerating aspen may be the loss of wood volume to local markets and consequently, jobs in the community.

With the no action alternative the amount of aspen by age class would remain the same as described in the affected environment with a disproportionate amount in both the 60+ year old age class and the less than 30 year old age class.

Softwood

No softwood stands would be treated and current trends would continue. No conversion of other forest types to softwood types would

occur from treatment. The density of trees on the site would continue to increase and regeneration is likely to occur where there is mortality.

The current softwood percentages in MA1.1 of the project area of 6% for pulpwood and 3% for sawtimber would probably increase in the short- to long-term (5-20+ years) as some aspen stands naturally convert to conifer species. This may also slightly increase the softwood percentages for MA1.1 Forestwide.

As some stands naturally convert to conifer, the amount of softwood seedlings is likely to increase in the short to mid-term (5-20 years). In addition, some of the softwood seedlings/saplings that are currently in the aspen understory would move into the pole-sized age class and more fully balance the age class distribution of softwood.

Temporary Openings

There would be no temporary openings created with this alternative. Any openings would be created through natural disturbances. Tree species that rely on openings for regeneration and sustenance would decline in the mid- to long-term.

Other Resource Concerns

Invasive Plant Species

This alternative would not treat any invasive plant species or clearcut any forest stands. The areas of infestation would remain and are likely to grow in size. Because no openings would be created with this alternative, which would otherwise increase the growth and seeding of glossy buckthorn, the effects to tree regeneration and growth should not be measurable.

Riparian Influence Area Planting

Conifer planting would not occur within riparian influence areas with this alternative. The structural diversity of these areas and the dead and down material would increase in time, but at a much slower rate than would occur with management action.

Vegetative Management along the NCT

There would be no harvest treatment along the North Country Trail (NCT) with this alternative. Tree density would continue to increase and early seral species would decline in the long term. The incidence of mortality due to competition and insect and disease would increase, which would create additional trail maintenance or possible safety concerns if hazard trees are not felled.

MA 9.3

No vegetative management is proposed in Management Area 9.3 with this alternative. The forested areas would continue to progress into later stages of succession barring any major natural disturbances. The aspen forested types would eventually succeed into hardwood or conifer forest types. Open areas would continue to fill in with tree species on areas that are able to support forest types. In the short- to mid-term (2-15 years) there would be little change form current conditions. Forest vegetation would appear natural with little evidence of human activities as described in the desired future condition for this area.

3.1.3.2 Direct/Indirect Effects on Vegetation of Alternative 2

The main emphasis of this alternative is to fulfill the needs that were identified by comparing the current condition with the DFC from the Forest Plan for MA 1.1. In regards to vegetation, this alternative was proposed to address the following needs:

- Maintain levels of early successional forest types within the DFC;
- Improve the percentage of softwood sawtimber and pulpwood;
- Maintain existing levels of hardwood sawtimber and pulp with an emphasis on even-aged management;
- Improve the quality and growth of forest stands;
- Provide for recreational needs;
- Provide a supply of wood products for the local economy.

MA 1.1

Hardwood

Uneven-aged Treatment

The amount of uneven-aged hardwood treatment proposed under this alternative is approximately 90 acres, which would receive an individual tree selection harvest. This type of harvest would reduce density and create space in the tree canopy for improved diameter growth and tree vigor, which should return to current levels in about 15 years or around the time of the next entry cycle.

Tree species diversity and the start of a new age class would be accomplished by creating small openings or canopy gaps within the stands. The intolerant and mid-tolerant species (e.g. northern red oak, white ash, and yellow birch) would be released from competition with the removal of adjacent and overtopping trees. Some seedlings and saplings would also be released, but for the most part the overall stand structure would remain the same.

Intermediate Treatment

The amount of intermediate treatment proposed in hardwoods is 755 acres. The majority of the commercial thinning would be low thinning, which is removing trees from the lower crown classes. This simulates the removal of these crown classes as it would occur in natural stand development.

This treatment supports the development of an even-aged stand and fosters increased diameter growth while creating temporary canopy gaps to accelerate crown expansion of the remaining trees for future seed production. Most of the stands proposed for treatment are from 70-100 years old.

Overstory Removal

The overstory removal proposed on 85 acres would remove the mature overstory of aspen and undesirable maple, and release the sapling and pole-size hardwoods. It would also encourage the development of some intolerant species such as paper birch.

Post harvest timber stand improvement may be needed to improve species composition and quality of the residual stand. A determination for post harvest treatment would be made based on stocking survey information. These stands could be managed either even- or uneven-aged in the future.

Shelterwood Treatment

Other proposed hardwood treatment would include shelterwood cutting on 110 acres. The shelterwood treatment, to be followed by conifer underplanting, would ultimately convert the hardwood to white pine types.

Aspen

Maintenance or Conversion to Aspen

Under this alternative, approximately 1,890 acres are proposed for clearcutting or clearcutting with residual timber to regenerate or convert to aspen. The proposed clearcut treatments would convert 150 acres of other forest types (30 acres hardwood and 120 acres mixed conifer/aspen) to aspen, and maintain 1,740 acres of existing aspen.

The clearcut treatments should result in fully stocked aspen seedling/sapling stands in 3 to 5 years. After treatment, the clearcuts would have most of the advanced and non-merchantable hardwood and conifer regeneration removed, if needed.

A short-term effect of the proposed clearcut treatments would be an increase (11%) in the amount of aspen under 35 years of age, further skewing the age class distribution to a disproportionate amount of younger aspen (67%). This would, however, help to maintain the aspen component on the landscape so future treatments could be designed to address the age-class imbalance. It would also influence the amount of aspen pulpwood available for harvest in the future (40-50 years).

Another short- to mid-term effect of the proposed clearcut treatments would be an abundance of immature, early successional habitat for dependent wildlife species.

Conversion out of Aspen

There are 230 acres of aspen types that would be converted to other forest types with this alternative. This includes 180 acres of shelterwood cutting and underplanting with white pine, and 50 acres of commercial thinning to emphasize the hardwood component. The decision to convert these stands was based on low densities of aspen for regeneration, or small inclusions of mature aspen in stands that are now dominated by more hardwood than aspen. This would help meet the need to increase the amount of long-rotation conifer component at a very modest rate, a Forestwide objective in the Forest Plan (page, IV-5).

An effect of this conversion would be a decrease in available aspen pulpwood in the future. These treatments should, however, improve the quality and growth of the resulting hardwood stands and increase the percentage of softwood sawtimber in the long-term.

Aspen Summary

The overall effect of the proposed treatments to maintain or convert to or from aspen is a net loss in aspen type of approximately 80 acres. This net loss would reduce the percentage of aspen type in MA 1.1 of the project area from 72% to 71%.

In the short- to mid-term, the percentage of aspen forest types would remain at 71% in MA1.1 of the project area. However, the percentage of aspen type would gradually decrease in the long-term because some of the existing mature aspen stands are on unsuitable ground for timber production (refer to Table 3.1.1 or see Aspen discussion under subsection 3.1.3.1). Because of this, the long-term percentage of aspen in MA 1.1 of the project area is likely to be reduced to approximately 60% (refer to Table 3.1.1).

Softwood

White Pine Type

Alternative 2 proposes a total of 290 acres of shelterwood treatments to be followed by underplanting of genetically improved white pine seedlings for an eventual conversion to a white pine forest type.

Most of these acres are presently aspen (180 acres, see aspen discussion), and some are hardwood types with mature hemlock, white cedar, white pine, and aspen in the overstory (110 acres, see hardwood discussion). Two of these stands, an aspen (15 acres) and hardwood (20 acres) type, have a substantial overstory of white pine already, so a shelterwood treatment in those stands would convert them directly to white pine.

The shelterwood cuts would leave approximately 50% crown cover. After the seed cut is conducted, the stand would receive site preparation to remove undesirable advance regeneration and be planted with white pine.

Post-treatment timber stand improvement may be needed to release seedlings and/or apply tubing to protect seedlings from browsing. This would provide seedlings with optimal growing conditions. The need for any post-treatment activity would be determined from stocking surveys.

There may be some risk of wind throw in the aspen, but enough would remain to allow for shelter of the white pine seedlings.

Ten acres of existing white pine type would have an individual tree selection harvest that would improve stand health and growth and release conifer seedlings and saplings already established within the stand. This white pine stand has an overstory of mature to pole-size white pine and aspen with an understory of fir, spruce, and red maple. Individual aspen and red maple would be removed to create openings in the canopy to enhance the development of white pine poles and release the fir and spruce seedlings.

Spruce/Fir Types

Approximately 125 acres of spruce-fir types (softwood pulpwood) would be treated with Alternative 2. Most of this (120 acres) would be converted to aspen/spruce/fir type with clearcutting, where aspen would become the predominant component. The remaining 5 acres would be clearcut and planted with spruce.

Hemlock Type

In addition to the treatments for white pine and spruce/fir types, 15 acres of hardwoods containing a substantial hemlock component would be treated for conversion to a hemlock forest type.

Softwood Summary

The net result of the proposed treatments would be an increase of 180 acres (approximately 1%) in softwood forest types (refer to Table 3.1.1).

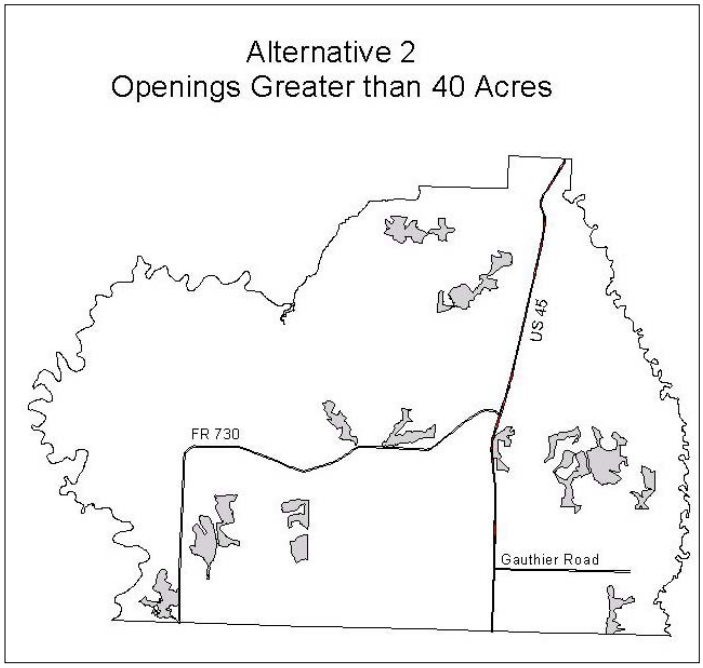


Figure 3.1.4. Alternative 2 - Temporary openings greater than 40 acres.

Temporary Openings

A direct but short-term result associated with the proposed clearcutting under this alternative would be the creation of 15 temporary openings greater than 40 acres. The size of these openings would range from 50 to 175 acres and average 105 acres. Many the openings would occur as consecutive stands barely adjoining each other across the landscape, versus one large contiguous block (see Figure 3.1.4 for specific shapes and locations of these temporary openings).

Because most of the temporary openings that would be created do not lie adjacent to recent clearcuts, it should take approximately 5 years before these proposed clearcut stands would no longer be considered temporary openings. This is the estimated time it should take for these stands to reach a height that is greater than 20 percent of the height of the surrounding vegetation (approximately 14-16 feet). Once this height is attained, these areas would no longer be considered openings (Forest Plan, page IV-87).

For stands proposed for clearcut under this alternative that do lie adjacent to recent clearcuts, the amount of growing time needed before these harvested areas are no longer considered temporary openings may be less. This is because the adjacent past clearcuts have been growing for at least 2-3 years already, and may only need one or two more years before they would reach a height that is greater than 20 percent the height of the surrounding uncut vegetation.

A direct effect of creating temporary openings greater than 40 acres through clearcutting is that stands of aspen needing treatment would be harvested and maintained as an important component across the landscape. Also, the aspen forest product would be removed while it is still merchantable and the economic value would be captured before it is lost to insects, disease, or mortality.

Other Resource Concerns

Invasive Plant Species

This alternative would not treat glossy buckthorn or any other invasive plant species. Clearcutting is proposed in at least three of the stands infested with glossy buckthorn, and hauling would occur throughout the area.

Once established, glossy buckthorn can spread aggressively because it thrives in habitats ranging from full sun to dense shade and is adaptable to adverse conditions. Buckthorn grows fast, and can reach heights up to 20-25 feet. This can result in dense shade which may prevent the establishment of tree seedlings or slow their growth (Wisconsin DNR Factsheet [Online] 2003). If left untreated, the areas of infestation would remain and are likely to grow in size.

A direct effect of clearcutting would be opening the stand to full sunlight. Buckthorn thrives in full sunlight and is a vigorous sprouter and seed producer. Winter harvesting of aspen clearcuts would help ensure that aspen suckering would be vigorous to effectively shade and outgrow buckthorn plants.

The clearcut units that contain glossy buckthorn are part of the list of recommended "winter only" harvest units contained in Table B-1 in Appendix B.

Riparian Influence Area Planting

Under this alternative, conifer planting would not occur within riparian influence areas. The conifer component, structural diversity, and the dead and down material in these areas would likely increase in time, but at a much slower rate than it would with active management.

Vegetative Management along the NCT

Clearcutting would not occur immediately adjacent to the North Country Trail (NCT) with this alternative because buffers from approximately 66 to 150 feet in width would be established along both sides of the trail where clearcutting is proposed (see Figure 3.1.5). The intent of these buffers is to retain some vegetative structure within the foreground view from the trail in an attempt to obtain the Visual Quality Objective (VQO) of Partial Retention along the trail (see Recreation/Visuals, Section 3.8).

The buffering would be done in 4 stands and would involve a total of approximately 0.7 mile of trail (see Figure 3.1.5). Stands 6 and 7 in compartment 72 would have about 0.4 mile of trail buffered, while stand 6 in compartment 134 and stand 17 in compartment 135 would have approximately 0.3 mile of trail buffered. The estimated amount of forest that would not be treated due to buffering is approximately 8 acres.

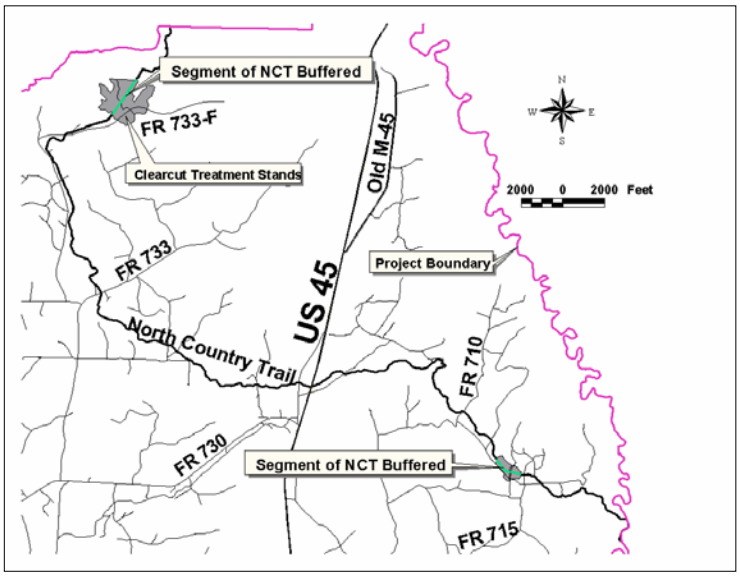


Figure 3.1.5. Alternative 2 - Segments of NCT to be buffered.

Tree density is likely to increase in the buffered areas, but the presence of early seral tree species, particularly aspen, would decline in the long-term due to lack of treatment. The result would be reduced species and habitat diversity along the trail, which would eventually result in a linear stand or corridor of conifer or hardwood for miles. This would be in contrast to the management prescription for MA 1.1, and would not help to maintain moderate to high amounts of aspen type along with associated timber products and habitat conditions (Forest Plan, page IV-103). In addition, the buffers would not help to provide an appearance to the trail user that is predominantly forested with frequent

temporary openings (Forest Plan, page IV-103).

The incidence of tree mortality due to competition and insect and disease is likely to increase without treatment in these buffered areas. This could result in additional trail maintenance being needed or possible safety concerns if hazard trees are not felled.

Refer to Recreation/Visuals, Section 3.8 for further discussion of effects.

Effects of Other Resource Projects

Snowmobile Trail Relocation

The majority of the trail relocation would be on existing roads; however, a short segment of this relocation would involve clearing an area approximately 20 feet wide for approximately 0.75 mile to make a connection between these existing roads (see Map K in Appendix A).

A direct effect of this trail relocation would be the removal of approximately 1.8 acres of mixed hardwood and aspen forest types from timber production for the long-term (20+ years). However, the trees remaining along the trail would utilize this space to expand their canopies and should experience increased growth. Therefore, the overall effect to the timber resource should be negligible.

Gravel Pit Expansion

The proposed gravel pit expansion would affect forested vegetation by directly removing approximately 5 acres of land from timber production. This land would be reclassified as forest land developed for nonforest use (Forest Service Manual (FSM) 1905).

This land is currently stocked with hardwood-yellow birch forest type with inclusions of eastern hemlock. Because the road to the pit is gated, the effects from other forest users on vegetation would be limited.

Dispersed Parking/Camping Site Enhancement

The proposed maintenance or development of 22 dispersed recreation parking and camping sites adjacent to Forest System Roads 730 and 733 would enhance these areas for Forest users and help to protect forest resources. The majority of these sites are existing sites that already receive use for the stated purposes, but use at some of the sites results in parked vehicles and campers blocking gates and limiting road access.

A direct effect of this project would be the removal of small areas of mixed hardwood and aspen forest types to develop or expand sites so their use would no longer result in blockage of gates and road access. These areas would ultimately be removed from timber production for the long-term. This would be a permanent change in land use for the foreseeable future, however, these individual sites are not contiguous or of sufficient size to permanently change their land suitability classification.

Indirect effects on vegetation from this activity may be decreased growth of trees adjacent to these sites. This would be due to soil compaction related to hardening and use of these sites. Damage to adjacent trees may also occur from Forest users driving nails or other objects into the trees.

Opening Reconstruction and Road Mowing

Many of the openings proposed for maintenance are old landing sites or are parts of old fields or homestead openings, and are all within MA1.1. The proposed road mowing would occur on existing Forest System Roads, which are also located in MA 1.1.

The direct effect of both the opening reconstruction and road mowing is that these areas would continue to be non-forested and removed from mid- to long-term timber production. The openings create vegetative diversity on the landscape; however, the effects are reversible in the long-term.

Large Woody Debris Creation and Alder Cutting

These projects would have little impact on vegetation. This is because the large woody debris would be created in stands already proposed for treatment, and the amount created is not expected to affect regeneration of these stands. The downed logs could also

serve as nurse logs for hemlock seedlings in the future.

The proposed alder cutting would be regenerating what is already on the site and would not be a conversion of vegetation types. Cutting the alder would help to improve its growth and vigor.

Old Growth Classification

No additional old growth would be classified under this alternative and the total acres of old growth in MA 1.1 of the project area would remain the same as current conditions, 614 acres or 2.5% of the forested land.

The Forest Plan directs that stands classified as suitable forest that are adjacent to old growth will be managed using uneven-aged management practices (Page IV-91). The direct effect of keeping these acres classified as old growth is that adjacent aspen or other existing even-aged stands could not be treated with even-age practices to regenerate and maintain the present forest type. This would ultimately result in the conversion of these stands to an uneven-aged and more shade tolerant conifer or hardwood forest type.

MA 9.3

The only action proposed in Management Area 9.3 is the decommissioning and closure of a road segment to passenger vehicles, along with the improvement and hardening of an existing parking area next to the Ontonagon River. This project is proposed to protect soil and water resources. Persons wishing to access the river for recreational activities would have to walk from the parking area to the desired location on the river, and canoes and kayaks would have to be carried from the parking area to the river.

A direct effect of the parking area improvement on vegetation would be the removal of approximately one-quarter acre of adjacent mixed hardwood forest type from timber production for the long-term (20+ years). This would be a permanent change in land use for this area.

Decommissioning and closing the road to passenger vehicles would allow vegetation to slowly re-establish along the existing road clearing over the mid- to long-term. This area would still be used as a trail for river access, so the continued use may prolong or prevent full utilization and re-establishment of vegetation on the site.

In the short- to mid-term (2-15 years), the forested portions of MA 9.3 would experience little change from current conditions. Over time, the forested areas would continue to progress into later stages of succession barring any major natural disturbances. The aspen forest types would eventually succeed to hardwood or conifer forest types. Open areas would continue to fill in with brush or tree species on areas that are able to support forest types. Forest vegetation would appear natural with both the action and no action alternatives, with little evidence of human activities as described in the desired future condition for this area.

3.1.3.3 Direct/Indirect Effects on Vegetation of Alternative 3

The main objective and emphasis of this alternative is to address the issue of aspen management by treating and maintaining existing aspen stands before they naturally convert to other forest types. This alternative would also keep a high amount of early successional species on the landscape over the long-term, in accordance with amounts set in the Forest Plan (page IV-105).

MA 1.1

Hardwood

Uneven-aged Treatment

This alternative has the most uneven-aged management (individual tree selection) of any alternative, 312 acres. Two of the hardwood stands proposed for even-aged management (commercial thinning) in Alternative 2 would be managed uneven-aged with this alternative. These stands are adjacent to Forest Road 730 and are dominated by sugar maple, which are

two criteria for uneven-aged management in the Forest Plan (page IV-109).

Individual tree selection is used to reduce tree density, encourage tree species diversity, and establish a new age class. This type of treatment would create 3 to 8 canopy gaps per acre for regeneration and create growing space for the remaining trees in the stand. To promote diversity, mid-tolerant species such as northern red oak, white ash, and yellow birch would be released from competition with the removal of adjacent and overtopping trees. Growth rates and tree vigor would be increased in the short-term and should return to current levels in about 15 years. Some seedlings and saplings would be released as well, but for the most part the stand structure would remain as it is now. All stands proposed for uneven-aged treatment have a strong tendency toward sugar maple.

Intermediate Treatment

There are 985 acres of hardwoods proposed for improvement cutting with this alternative. Most of the treatment occurs in mixed hardwood forest types, with some in hardwood-yellow birch, hardwood-basswood, or sugar maple forest types.

Improvement cutting can be done in either even- or uneven-aged stands, with the purpose of releasing trees to improve the composition, form, and/or growth of the residual stand (Daniel 1979). The proposed improvement cutting is intended to reduce tree density and to increase current growth rates by harvesting unhealthy and poor-formed trees. Mortality of the remaining trees over the next 10 to 20 years would mostly be limited to competition, insects, and disease.

In addition to the improvement cuts discussed above, there are 279 acres proposed for improvement cutting in hardwood stands that have inclusions of aspen. These stands would be treated to release the hardwood portion of the stand, and where the aspen is concentrated in at least one-acre areas, it would be treated with small clearcuts. It is estimated that 60% of the treatment in these stands would involve improvement cutting, and the remaining 40% would involve the scattered patch clearcuts.

The effect of this treatment would be the retention of the aspen inclusions while improving the growth and vigor of the remaining hardwood stand treated. This would be consistent with Forest Plan direction to manage timber stands to retain selected inclusions of aspen (page IV-65). The resulting stand would also have an increased diversity of species.

Although scattered portions of these stands would be an aspen type, these stands would still be tracked as hardwood types because the aspen inclusions would be too small to make them individual stands.

Shelterwood Treatment

Only one hardwood stand that is approximately 20 acres would be proposed for shelterwood cutting. This stand already contains a substantial overstory of white pine, so a shelterwood treatment would convert it directly to white pine.

Aspen

Maintenance or Conversion to Aspen

This alternative was developed by evaluating for treatment all the suitable aspen, aspen-fir, and fir-spruce-aspen stands in MA 1.1 that are over 50 years old. As a result, this alternative proposes to manage the largest amount of aspen, approximately 3,710 acres.

Approximately 3,580 acres of the existing mature aspen would be treated with clearcuts or clearcuts with residual timber. The additional acres would come from clearcutting approximately 130 acres of fir-spruce-aspen stands to convert them to aspen.

To accomplish this objective, clearcutting areas larger than 40 acres would be necessary. This would allow for the most maintenance of the existing aspen component and allow for treatment of high risk stands before they convert to other forest types and their aspen component is lost.

If necessary, post harvest treatment in the clearcut areas would include removing non-merchantable hardwood or conifer seedlings or saplings. These treatments would help ensure fully stocked aspen stands in 3 to 5 years.

Non-commercial aspen clearcutting and maintenance for wildlife would occur on approximately 40 of the 3,710 acres. This treatment would involve hand cutting or girdling the trees, which would remain on site. The girdled trees would die within a year or two and should break apart and come down over a period of 5 to 10 years, slowly releasing the young aspen sprouts. If needed, saplings and sprouts of other tree species would be removed with the treatment to favor growth of the aspen sprouts.

Leaving the standing trees would adversely affect aspen growth and suckering to some extent, but the treatment would ultimately regenerate and maintain the area to aspen.

A direct and short-term effect of the proposed treatments would be an increase (21%) in the amount of aspen under 35 years of age, further skewing the age class distribution to younger aspen. This would result in a disproportionate amount of aspen in the less than 34-year age class (77%).

This abundance of young aspen would directly influence the amount of aspen pulpwood available for future harvest. It would also provide the opportunity to manage a better distribution of the aspen age classes through future harvest treatments.

Other short- to mid-term effects of the proposed treatments would be an abundance of immature, early successional habitat for wildlife species.

Conversion out of Aspen

This alternative would convert approximately 120 acres of aspen to other forest types. The proposed treatments include shelterwood cutting followed by underplanting of white pine (65 acres) and improvement cutting to promote the softwood pulp component (55 acres).

The decision to convert these stands was based on the low density of aspen they contain, which could hinder adequate aspen regeneration. It also provides an opportunity to increase the amount of long-rotation conifer component at a very modest rate, which is a Forestwide objective (Forest Plan, page IV-5).

Two of the aspen shelterwood cuts are adjacent to U.S. Highway 45 and would meet the visual quality objective of partial retention along the highway more fully than clearcutting. The other aspen shelterwood has a substantial overstory of white pine, so a shelterwood treatment would convert the stand immediately to white pine.

The improvement cutting would improve the quality and growth of conifers important to wildlife and help establish and improve the percentage of softwood sawtimber and pulp in the management area.

Aspen Summary

The net result from proposed aspen treatment activities would be about a 70 acre increase in aspen forest type in the short-term. The percentage of aspen in MA1.1 of the project area immediately after treatment would be 72% (refer to Table 3.1.1).

For the long-term, the proposed treatments would maintain the aspen type within the desired range for MA 1.1; however, over time the aspen type would gradually decrease by approximately 2,670 acres because some of the existing mature aspen stands are on unsuitable ground for timber production. As a result, the long-term percentage for MA 1.1 of the project area would drop to 61% and down to 54% for MA 1.1 Forestwide as these stands naturally convert to other forest types (refer to Table 3.1.1).

An indirect effect of this alternative would be the maintenance of aspen on the ground and the assurance of aspen forest type in the future. Many of the stands proposed for treatment are greater than 60 years old and are declining in health and vigor. Repeated defoliation by the forest tent caterpillar has also taken energy reserves for the mature trees. The stands are probably losing timber volume to decay faster than growth is accumulating.

The long-term effect of not treating the suitable acres as proposed would be a gradual conversion of mature aspen stands to either conifer or hardwood types. In many of the stands, a sapling- to pole-size understory of hardwood or conifer is developing under the aspen and the stands are in the process of converting to another forest type. This alternative would capture the pulpwood value of the aspen and ensure that aspen be maintained on the site.

Softwood

There are approximately 215 acres of shelterwood treatment in this alternative with more than half of the treatment in softwood forest types (130 acres). The remaining acres are in aspen (65 acres, see aspen discussion) and hardwood types (20 acres, see hardwood discussion). The aspen and hardwood shelterwood treatments were described previously. All shelterwood treatments would be the same as described in Alternative 2.

The shelterwood treatment that is in the softwood types would occur mostly in white pine (80 acres), but 50 acres would be treated in mixed swamp conifer. The swamp conifer has a component of white pine, hemlock, and white cedar with aspen in the overstory. It also has a moderate amount of red maple and black ash.

In the white pine stands most of the trees species are less than 100 years old, but the mature white pine is older. One of the treatments would be in a 15 acre stand, and is a non-commercial shelterwood treatment adjacent to Forest Road 730. Treatment in this stand would remove the red maple saplings and some of the hardwood poletimber throughout the stand to create openings for white pine planting. It would also release and create growing space for white pine seedlings already present.

Other proposed treatment in existing conifer types would be clearcutting approximately 130 acres of softwood for conversion to aspen.

The total amount of other forest types converted to softwood is 180 acres (85 acres to sawtimber through shelterwood cutting and 95 acres to pulpwood through improvement cutting). The net increase in softwood is approximately 50 acres and all of this is sawtimber.

Softwood Summary

Compared to the proposed action, this alternative increases the percentage of softwood pulp slightly, but lowers the percentage of softwood sawtimber. Compared to the existing condition, the result of the treatment would be an increase in softwood sawtimber from 2.6% to 3.1%, and a decrease in softwood pulp from 6.1% to 5.8% within MA 1.1 of the project area (refer to Table 3.1.2.)

Temporary Openings

A direct result of this alternative would be the creation of 28 temporary openings greater than 40 acres. The size of these openings would range from 41 to 324 acres (110 acres average), and half of the openings are less than 90 acres. Many of the created openings are stands barely adjoining each other across the landscape, versus one contiguous open block of ground, and some are interspersed between recent clearcuts (refer to Figure 3.1.6 below for specific shapes and locations of these temporary openings).

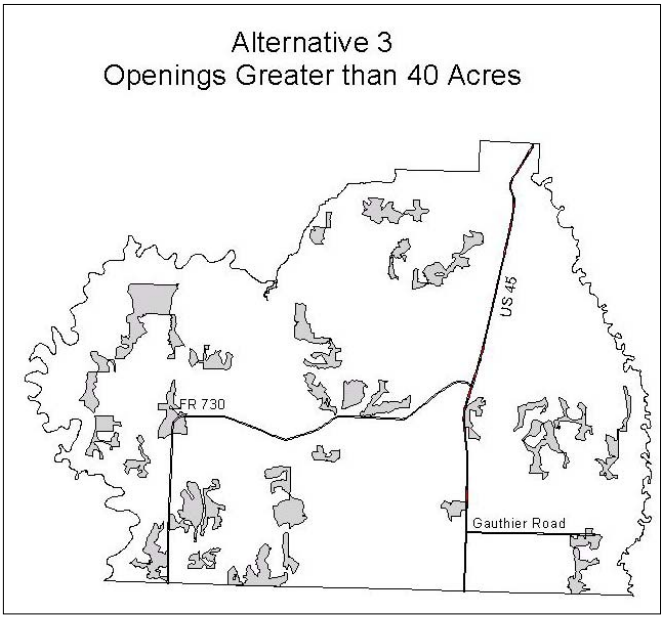


Figure 3.1.6. Alternative 3 - Temporary openings greater than 40 acres.

The majority of created openings would be the direct result of harvesting associated with this alternative, rather than harvesting adjacent to recent clearcuts. Therefore, it would take approximately 5 years before the stands would reach a height that is greater than 20 percent of the height of the surrounding vegetation (approximately 14-16 feet). For stands that lie adjacent to recent clearcuts, the amount of time would be less. In some cases it may be only one or two years depending on when the adjacent stand was treated, and when the proposed timber sale is sold and cut.

Other Resource Concerns

Invasive Plant Species

Clearcutting is proposed in at least three of the stands infested with glossy buckthorn, and timber hauling would occur throughout the infested area.

A direct effect of clearcutting would be opening the stand to full sunlight. Buckthorn thrives in full sunlight and is a vigorous sprouter and seed producer. Buckthorn grows fast and can reach heights up to 20-25 feet. This can result in dense shade which may prevent the establishment of tree seedlings or slow their growth (Wisconsin DNR Factsheet [Online] 2003). Winter harvesting of aspen clearcuts would help ensure that aspen suckering would be vigorous to effectively shade and outgrow buckthorn plants.

The clearcut units that contain glossy buckthorn are on the list of recommended "winter only" harvest units contained in Tables B-2 and B-3 in Appendix B. The effectiveness of noxious weed treatment with this alternative is described in Botanical Resources, Section 3.7.

Riparian Influence Area Planting

Conifer planting would not occur within riparian influence areas with this alternative. The structural diversity and the dead and down material in these areas would increase in time, but at a much slower rate than would occur with management action.

Vegetative Management along the NCT

Clearcutting would occur along the North Country Trail with this alternative. A direct effect would be the removal of most trees greater than 5 inches in diameter along the trail. The width of open area along the trail would vary by the existing stand width and the residual saplings and seedlings left on site.

Almost one mile (5000 feet) total of the NCT would be affected by the proposed clearcuts; however, this would occur in four separate segments. The longest section of trail affected would be approximately 2000 feet, and the shortest would be approximately 400 feet (see Figure 3.1.7 for location of proposed clearcuts along the NCT).

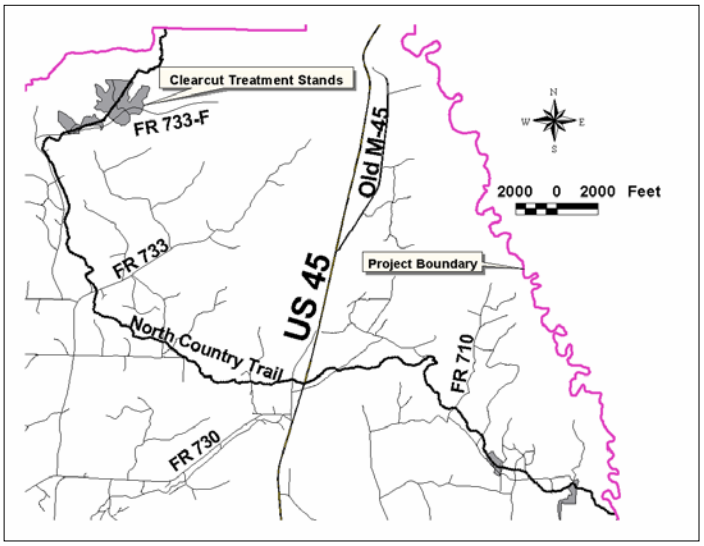


Figure 3.1.7. Alternative 3 - Proposed clearcut treatment stands along NCT.

The impact of these treatments would be short- to mid-term (5-15 years) while the stand regenerates to a fully-stocked stand and trees grow in height and diameter. Within 5 years the treated areas should be fully stocked and 10-15 feet tall.

The visual impact of these treatments could be positive or negative, depending upon the user. Openings can offer both visual and habitat diversity along the trail, and can provide vistas if located in hilly terrain. While other areas of the trail would have an appearance that is predominantly forested, these treatments

would help to provide the frequent temporary openings as stated in the management prescription for MA 1.1 (Forest Plan, page IV-103).

The clearcut treatments would also retain aspen and other shade intolerant species and provide vegetative diversity along the trail in the long-term (20+ years). This would maintain the experience of changing forest types and habitat diversity as trail users pass through the Forest.

In addition, this alternative would harvest mature aspen trees along the trail before they become a hazard to trail users. These treatments would, however, reflect human activity on the land.

Refer to Recreation/Visuals sections 3.8.4 and 3.8.6 for additional discussion of effects.

Effects of Other Resource Projects

The effects of the proposed snowmobile trail re-route, gravel pit expansion, opening reconstruction, road mowing, large woody debris creation, and alder cutting would be the same as those described in Alternative 2.

There would be no additional stands classified as old growth in this alternative, and the effects would be the same as described in Alternative 2.

3.1.3.4 Direct/Indirect Effects on Vegetation of Alternative 4

This alternative emphasizes softwood management with temporary openings less than 40 acres in size. It treats less aspen through clearcutting than Alternative 3, and would retain the least amount of aspen of all the action alternatives. Shelterwood and overstory removal treatments would be used to convert mature aspen types to conifer and hardwood types. This alternative would also utilize intermediate treatment of hardwoods to improve composition, quality and growth.

MA 1.1

Hardwood

This alternative would treat most of the hardwoods with improvement cutting, and is the only action alternative with no uneven-aged management. The stands proposed for individual selection treatment in the other alternatives would be treated with improvement cutting in this alternative.

Treating these stands with an intermediate improvement cut would reduce tree density to increase growth of the residual trees, and would improve stand health and quality by removing unhealthy and poorly formed trees. It would also leave the stands with the option to manage them either even- or uneven-aged in the future. Mortality of the remaining trees due to competition, insects, and disease over the next 10 to 20 years would be limited.

Like Alternative 3, this alternative also proposes improvement cutting with patch aspen clearcuts in approximately 122 acres of hardwood types. The effect of this treatment would be the same as that described in Alternative 3.

The remaining treatments proposed for hardwood stands in this alternative are shelterwood cutting followed by conifer underplanting (20 acres), and clearcutting one stand (55 acres) for conversion to aspen type. The effects of the shelterwood cutting are described in Alternative 3. Because only one hardwood stand (approximately 35 acres) would be clearcut for conversion to aspen type, the effects were determined to be negligible and this alone would not change the percentage of hardwood or aspen types in the project area.

Aspen

Maintenance or Conversion to Aspen

The existing aspen type maintained (approximately 1,655 acres) would be accomplished through clearcutting or clearcutting with residual timber. Another 245 acres of aspen type would be maintained by improvement cutting or overstory removal

cutting on predominantly aspen stands, which would move the stands to an aspen/conifer mix. Approximately 110 acres of other forest types would also be clearcut for conversion to aspen. This would include approximately 55 acres of hardwood type and 55 acres of mature fir-spruce-aspen type. Following harvest, these treatments would have most of the advanced regeneration and hardwood sprouts removed if needed. The treatments would result in fully stocked aspen seedling/sapling stands in 3 to 5 years.

A direct and short term effect of treatment would be an increase in the amount of aspen under 35 years of age (18%), further skewing the age class distribution to younger aspen. A disproportionate amount (74%) would be in the less than 34 year-age class.

The indirect effect of this treatment would be an abundance of immature, early successional habitat in the short-term with a decrease of aspen habitat in the long-term. It would also influence the amount of aspen pulpwood available for harvest 40-50 years in the future. It would be advantageous to distribute the age classes more evenly with future harvesting.

Conversion out of Aspen

Approximately 1,715 acres of existing aspen types would be converted to other forest types. This would involve shelterwood cutting and planting for white pine (505 acres), overstory removal cutting of aspen over a conifer and hardwood understory (720 acres), clearcutting and planting for white spruce (15 acres), and improvement cutting (475 acres). The overstory removal cuttings would remove the overstory of mature aspen, and the remaining understory would have concentrations of aspen, balsam fir and white spruce seedlings and saplings. It is expected that the future stands would contain higher concentrations of fir and spruce, but there would likely be enough open area in these stands to allow some suckering of aspen to occur. As a result, it may take more than one treatment to complete the conversion of these stands. However, because aspen would likely remain a component of these stands after treatment, this may provide the option for future treatment to convert these stands back to aspen types.

Improvement cuttings would improve the quality and growth of both softwood and hardwood stands, and improve the percentage of softwood sawtimber and pulp in the management area.

Aspen Summary

The net loss of aspen with this alternative would be approximately 1,605 acres. The treatments proposed would keep aspen within the desired range in the long-term; however, the percentage of aspen type would gradually decrease over time because some mature aspen stands are on unsuitable ground for timber production (2,670 acres).

The percentage of aspen immediately after treatment in MA 1.1 for the project area would be 65%. Because aspen on unsuitable lands would not be treated, the long-term percentage would drop to 54% for the project area and down to 51% for MA 1.1 Forestwide (refer to Table 3.1.1), which is still within the range given in the Forest Plan (page IV-105). The long-term effect of not treating these unsuitable acres would be a gradual conversion from mature aspen types to either conifer or hardwood types. An indirect effect of this conversion would be a decrease in available aspen pulpwood in the long-term (20+ years).

Softwood

Alternative 4 proposes 680 acres of shelterwood treatment and planting of white pine for an eventual conversion to white pine forest type. This is 465 more acres than proposed in Alternative 3, where many of the same acres are proposed for clearcutting. Most of the shelterwood treatment acres are presently aspen (505 acres, see aspen discussion), and the rest are hardwood (20 acres, see hardwood discussion), or existing conifer types with mature fir, hemlock, white cedar, white pine, and aspen in the overstory (85 acres). Two other stands proposed for shelterwood treatment are existing white pine types and already have a substantial overstory of white pine, so shelterwood treatment in these stands would keep the present white pine type (70 acres).

The shelterwood treatments would leave approximately 50% crown cover. After the seed cut is conducted, the stand would be planted with white pine and treated to remove all advanced regeneration from around the planted seedlings. This would provide the seedlings with optimal growing conditions and resistance to white pine blister rust. Additional protection of seedlings from deer browse may be necessary, which would be decided from the results of stocking surveys. There may be some risk of wind throw in the aspen trees, but enough would remain to allow for shelter of the seedlings.

Approximately 285 acres of existing conifer type would be treated with this alternative (80 acres of sawtimber and 205 acres of pulpwood). Most of the conifer treated would stay in conifer type (215 acres), but 55 acres would be converted to aspen type with clearcutting and 15 acres to hardwood with improvement cutting (see hardwood and aspen discussions). In addition, approximately 1,370 acres of other forest types (1,310 acres aspen and 60 acres hardwood) would be converted to softwood. The conversion of these 1,370 acres would come from improvement cutting and overstory removal cuts (805 acres) to convert other types to softwood pulp, and shelterwood and improvement cuttings (565 acres) to convert other types to softwood saw.

Softwood Summary

A net increase of approximately 1,305 acres of conifer would be the result of the proposed treatments (655 acres in sawtimber and 650 acres in pulpwood.

Within the Baltimore project area immediately after treatment the result of the proposed treatments compared to the existing condition would be an increase in softwood sawtimber from 3% to 5% and an increase in softwood pulp from 6% to 9% (refer to Table 3.1.1, or Table 3.1.2 for a comparison with the DFC).

Temporary Openings

This alternative has the least amount of openings of all the action alternatives, and no openings greater than 40 acres in size would be created through harvest treatments.

A direct effect of limiting opening size is that aspen stands or parts of stands would not be treated for aspen regeneration. The amount of aspen type in the project area would be reduced as these areas convert to hardwood or conifer forest types either naturally or through improvement or removal cutting (refer to Table 3.1.2 for quantitative data on species composition before and after treatment, and for a comparison with the DFC).

Both improvement cutting and no treatment would leave a more complex forest structure compared to clearcutting. The stands would remain fully stocked with multiple age classes, leaving continuous forest cover in these areas. The effects of changes in species composition and forest structure on wildlife are detailed in Wildlife Resources, Section 3.3.

Other Resource Concerns

Invasive Plant Species

The effects of clearcutting in the three stands that contain glossy buckthorn would be the same as for Alternative 3. The effectiveness of noxious weed treatment with this alternative is described in Botanical Resources, Section 3.7.

Riparian Influence Area Planting

Conifer planting of white pine, white spruce, or hemlock in riparian influence areas would occur on as many as 170 acres with this alternative.

A direct effect of the planting would be to increase the amount of long-lived conifer within these areas so that it is a minor component of the stands. However, the planting is not expected to change any forest types or increase the overall conifer percentage.

Vegetative Management along the NCT

Like Alternative 2, clearcutting would not occur immediately adjacent to the North Country Trail with this alternative because a buffer from approximately 66 to 150 feet in width would be established along both sides of the trail where

clearcutting is proposed (see Figure 3.1.8). The intent of these buffers is to retain some vegetative structure within the foreground view from the trail in an attempt to obtain the Visual Quality Objective (VQO) of Partial Retention along the trail (see Recreation/Visuals, Section 3.8).

The buffering would be done in one stand and would involve a total of approximately 400 feet of trail (see Figure 3.1.8). The estimated amount of forest that would not be treated due to buffering is approximately one acre.

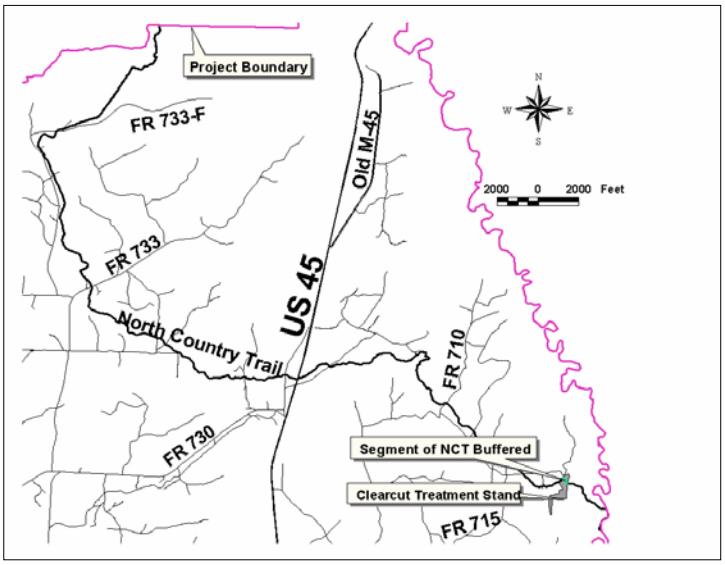


Figure 3.1.8. Alternative 4 - Segment of NCT to be buffered.

Effects of buffering the trail would be the same as those described for Alternative 2.

Effects of Other Resource Projects

The effects of the proposed snowmobile trail re-route, gravel pit expansion, opening reconstruction, road mowing, large woody debris creation, and alder cutting would be the same as those described in Alternative 2.

There would be no additional stands classified as old growth in this alternative, and the effects would be the same as described in Alternative 2.

3.1.3.5 Past, Present, and Reasonably Foreseeable Future Actions

Vegetation management has occurred within the project area over the past 100 or more years. Most of this area was heavily cut over in the early 1900s and many areas of resulting slash burned, creating a seedbed for aspen regeneration. Much of this area's aspen resulted from such major disturbance activities (refer to LTA 19 discussion in Soil Resources Section, page 3-84).

Most aspen regeneration did not begin until the late 1970s, and has continued at a fairly stable rate from that time on. More recently, the Baltimore area has had the following timber sales: Thundercat, Pierson Creek, Aldred Creek, Prowler, Johnson Creek, Victoria South, Plover South, Lathrop North, Winter Storm, Hide Creek, Military Hill, Upper Sandstone, and West Hide II. All of these sales treated the area with primarily even-age management for aspen regeneration, intermediate treatment of hardwoods, and small amounts of individual tree selection for uneven-age management.

The FY 2001 M&E Report (revised June, 2003), indicates that for MA 1.1 clearcut acreage is 33% below Forest Plan averages, and project decisions issued over the remainder of the Plan period need to emphasize practices of clearcutting and selection harvest. Some increase in shelterwood seed and removal cutting would also be appropriate (Page 101). This entry offers the potential to regenerate a large percentage of the aspen established after the heavy cutting in the early 1900s, and could be one of the last treatments in this type.

Following this project, the amount of aspen harvested would probably decline until more of the sapling and pole-sized aspen grow to merchantable size. However, an opportunity exists in the next 10-20 years to harvest younger aspen stands that originated from root suckering to more fully balance the age distribution of aspen in the area. Regardless, the Baltimore area would continue to be an important source of aspen pulpwood in the future.

There is likely to be more emphasis on even-aged management of hardwoods. Hardwood treatment would probably increase as intermediate treatments prepare stands for regeneration cuts. These treatments would favor trees that are moderately tolerant of shade, such as yellow birch and red oak.

While private landowners may continue to treat the vegetation in and around the Baltimore project area, the Forest would not reenter the area in the next 10 or more years. One exception would be if Alternative 2 is selected, which leaves a lot of mature aspen untreated. If so, treatment would possibly occur on the Bergland District in some of the mature aspen in the next decade.

Under the action alternatives, any of the stands treated with an overstory removal or clearcut would not be entered again for the next 30 to 50 years. Stands that are treated with a commercial thinning, improvement cutting, or individual tree selection may be entered in the next 10 to 15 years. Other stands treated with a shelterwood seed cut of aspen for white pine regeneration would not be entered in the next 30 to 50 years. The shelter trees are needed until the white pine is 20-25 feet in height and removal of the overstory at that time would not be feasible. In the event the white pine does not become fully established in these stands, they would need to be re-evaluated for potential management options and could be entered again in less than 30 years.

3.1.3.6 Cumulative Effects on Vegetation of All Alternatives

At the management area level, the same trends in relation to Forest Plan goals discussed in the FY 2001 M&E Report (revised June, 2003) (pages 10&11) would continue. As stated in this reference, additional effort is needed in maintaining the early successional stages of aspen, and the need and/or ability to accelerate aspen regeneration efforts, continue at the same rate, or allow for conversion to other habitat species needs to be explored and analyzed.

In relation to the aspen component, the Forest has a general habitat goal of approximately 138,000 acres; however, at the current pace of treatment, we may not be able to maintain all 138,000 acres (FY 2001 M&E Report, revised June 2003, page 11).

As stated in Chapter 1 (page 1-6), the project area contains approximately 35% of the Forest acreage devoted to MA 1.1. Many of the aspen stands currently are mature or overmature, and without disturbance, stands currently dominated by aspen will be replaced by species that are more shade-tolerant (Stone 1997). The project area also contains predominantly silty and clayey soils (refer to LTA 19 discussion in Soil Resources Section, page 3-84), and the best aspen sites have been found on soils with silt-plus-clay content of 80 percent or more (Burns and Honkala 1990).

This project, particularly Alternative 3, which would maintain the greatest amount of aspen and early successional habitat within the project area, offers one of the best opportunities to address these needs and reach or maintain the aspen habitat goal. It would also help to address the disparities for MA 1.1 as identified on page 101 of the FY 2001 M&E Report (revised June, 2003) (see discussion above).

With all alternatives, the amount of aspen forest type would continue to slowly decline in both the project and management area because unsuitable land for timber production would not be treated in the foreseeable future (refer to Table 3.1.1). In addition, any lands excluded from timber harvest due to resource concerns (i.e., visual or riparian buffers, etc.), versus land classified unsuitable, also removes land from treatment and increases the amount of aspen conversion to other forest types.

Over time, aspen that is not treated would move or succeed towards longer-lived conifers or hardwoods (refer to LTA 19 discussion in Soil Resources Section, page 3-84), but the suitable land managed for aspen would remain in aspen type. With continued management and regeneration, the amount of aspen in MA 1.1 would continue to be within the range given in the Forest Plan and provide opportunities for future management.

3.2 SOCIAL/ECONOMICS

3.2.1 Methodology

Items generally associated with social and economic aspects of a vegetation management project include effects on employment and whether or not the revenues from a timber sale exceed the costs of selling that timber. More specifically these items include social effects (jobs provided, income and taxes generated, and monetary return to counties), and the economic efficiency (revenues vs. costs or benefit/cost ratio) associated with timber harvesting.

Measures of economic efficiency used for analysis of this project are direct costs and revenues associated with timber harvest activities, and the resulting benefit/cost ratio. Costs associated with non-timber activities that are designed for wildlife and watershed habitat improvement or recreational projects are not charged to the cost of harvesting timber and are not shown. Many of these projects, however, may be funded or affected by revenues generated by the timber sales through the use of Knutsen-Vandenburg (K-V) funds. The costs of these associated projects are summarized and included in Table D-3 in Appendix D. Detailed calculations are located in the project file.

Each action alternative may produce non-monetary costs and benefits as well (e.g. wildlife habitat improvement, watershed improvement, recreational improvement and access, etc). These costs and benefits are addressed in the Final Environmental Impact Statement (FEIS) for the Forest Plan (pages II-3 to II-5, and IV-65).

3.2.1.1 Measurement Indicators

Even though the social/economic effects are most appropriately evaluated and measured at a broad scale, inferences can be made at the project scale using Forest-wide information. The following measures were used to compare alternatives:

Definitions

PILT -- Payment in Lieu of Taxes

25% Fund -- 25% of gross receipts distributed to counties where Forest System lands occur

Benefit/Cost Ratio – A measure of economic efficiency. The total discounted benefits of an activity divided by the total discounted cost.

Social Measures

- Jobs supported by timber harvest;
- Income generated by timber harvest;
- Federal income tax generated;
- 25% Return to Counties.

Economic Measures

- Total revenues;
- Total costs;
- Estimated volume;
- Benefit/Cost ratio.

3.2.1.2 Linked Objectives

Social/economics is primarily linked to the timber resources objective of providing a supply of wood products for regional and local needs to help support a stable economic base.

3.2.2 Social/Economics in the Affected Environment

The main industries in the western Upper Peninsula are logging, farming, tourism, and forest products manufacturing (paper and lumber milling). In 1996 this area contained 23 primary wood-using mills and produced nearly 50 percent of the State's veneer logs and 43 percent of the State's pulpwood (Haugen and Pilon 2002). Most mills have been running at or near full capacity, and the market for timber stumpage has been strong. Ontonagon County contains one primary wood-using mill.

The local area (Ontonagon County) consists of small towns and villages, as well as some rural year-round and vacation homes, hunting camps, farms, and forestland.

The current Forest Plan harvest level, or average annual Allowable Sale Quantity (ASQ), is 13.1 million cubic feet (MMCF), or approximately 78 million board feet (MMBF). The average volume sold over the fifteen years of Plan implementation has been 10.47 MMCF (64.9 MMBF), or approximately 80% of ASQ (FY 2001 M&E Report, revised June 2003, page 51).

The timber sale accomplishment to date has been limited due to funding and our organizational capability. In recent years, appeals and litigation have also delayed the implementation of projects and caused some target shortfall. The Forest has, however, accomplished 96% (65.9 MMBF of 68.6 MMBF average annual) of the target it was funded for over the past 15 years (FY 2001 M&E Report, revised June 2003, page 52).

3.2.2.1 Receipts and Payments

Receipts

Monies collected by the Forest Service come from a variety of sources, such as timber sale receipts, special use permits, and campground collections. Timber receipts represent about 98% of the total receipts on the Ottawa.

The receipts the Ottawa receives are deposited in a general treasury account. This means that the money collected (with the exception of Recreation Fee Demo receipts) is not necessarily returned to the resource program in the geographic area in which it was generated.

Payments

The federal government makes two kinds of payments to states in which National Forests reside. These payments are based on receipts generated and the amount of lands in federal ownership.

One kind of payment is the 25% payment. Local units of government receive payments for schools and roads equal to 25% of the revenue receipts on National Forests. The other kind of payment is the Payment in Lieu of Taxes (PILT) payment. PILT payments are federal payments to local governments that help offset losses in property taxes due to non-taxable federal lands within their boundaries.

Based on revenues from fiscal years (FY) 99-01, the total 25% fund payments to counties that include Ottawa National Forest land has averaged approximately $1,344,000, and total PILT payments has averaged approximately $586,500 (FY 2001 M& E Report, revised June 2003, Table II.61, page 170).

Ontonagon County has approximately 285,400 acres of Forest System land within its boundaries. In FY 2001, $336,095 was distributed to Ontonagon County through the 25% Fund, and $209,691 was distributed through PILT (FY 2001 Monitoring & Evaluation Report, page 170).

3.2.2.2 Related Jobs, Income, and Taxes

The 1998 Timber Sale Program Information Reporting System (TSPIRS) report shows that on the Ottawa National Forest, each MMBF harvested equates to 9.2 jobs, $486,552 of employment-related income, and generates $72,984 in federal income tax (USDA Forest Service, 2001).

From 1999-2001, the timber program on the Ottawa supported approximately 700 timber related jobs and $40 million in employment-related income annually. In addition, about $6 million of federal income taxes was generated from this income (FY 2001 M&E Report, revised June 2003, page 52).

3.2.2.3 Area of Potential Effect

For this project the bounds of analysis for the social analysis is Ontonagon County. Economics is analyzed at the project scale and includes only the areas proposed for treatment.

This is because this is the area where the social/economic impact of the proposed activities would be felt the most.

3.2.3 Direct, Indirect, and Cumulative Effects on Social/Economics

3.2.3.1 Direct/Indirect Effects on Social/Economics of Alternative 1

The No Action alternative would result in no harvest activities and no associated costs and revenues. There would be no timber sale receipts generated (K-V funds) to implement some of the proposed wildlife, watershed, botany, and recreation improvement projects. No associated costs or benefits from road construction, reconstruction, or maintenance would occur either.

Timber harvest and the resulting social/economic benefits lost would have to be obtained elsewhere on the forest, or the 25% and PILT payments would be reduced. The number of jobs created or sustained and the associated income tax generated is also likely to be reduced.

The quantity and quality of timber within the project area would not be improved and future timber value would be reduced.

3.2.3.2 Direct/Indirect Effects on Social/Economics of Action Alternatives

The social/economic effects of the action alternatives are summarized in Table 3.2.1. There is a noticeable difference between Alternative 2 and Alternatives 3 & 4 because these alternatives contain a substantially different proposed treatment area and associated harvest volumes. Even though the amount of treatment area proposed is nearly the same for Alternatives 3 & 4, there is still a notable difference, but it is not as great. This is because the type of treatment being emphasized is different for each alternative.

Table 3.2.1. Effects on Social/Economics Measures for All Alternatives.

Measurement Indicators	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Social[1]				
Jobs	-0-	270	480	428
Income	-0-	$14,267,164	$25,398,987	$22,661,645
Federal income taxes	-0-	$2,133,468	$3,809,911	$3,399,303
25% Return to Counties	-0-	$341,799	$655,318	$576,941
Economics[2]				
Total Revenues	-0-	$1,367,194	$2,621,273	$2,307,762
Total Costs	-0-	$871,039	$1,545,773	$1,473,990
Estimated Volume	-0-	29,323 MBF	52,202 MBF	46,576 MBF
Benefit/Cost Ratio[3]	-0-	1.6	1.7	1.6

[1] Jobs, income, and federal income taxes were determined using the TSPIRS factors described above.

[2] Revenues are based on a weighted average of timber sold and receipts generated for FY 2001 and FY2002. Costs include all direct and indirect costs associated with preparing and administering timber sales. Calculations are available in the project record.

[3] Above 1.0 indicates a positive benefit or return; less than 1.0 would indicate a negative return.

Social benefits resulting from the action alternatives and associated activities would include such things as related jobs that would be created or sustained, and greater contributions to local communities from timber sale receipts that would be applied to the 25% Fund. Other benefits, although difficult to measure, would include cleaner water (which would provide for better fisheries), more abundant wildlife habitat, and improved recreational opportunities and experiences for Forest users.

Economic benefits resulting from the action alternatives and associated activities could include some of the items mentioned above, plus the job-related income and income tax that would likely be spent in the local area, making for a more stable economic base in the local communities. Improving social benefits such as wildlife habitat and recreational opportunities could bring more tourists and hunters to the area, which would also help contribute to the economy of the local communities.

The analysis has shown that the revenues for all action alternatives would be greater than their associated costs, providing for a positive benefit/cost ratio. Alternative 3 has the highest benefit/cost ratio and would provide the greatest benefit across all measures. The benefit/cost ratio for Alternatives 2 & 4 appears to be the same; however, looking at the social measures, Alternative 4 exceeds Alternative 2 and would provide for more timber-related jobs, income, and income taxes, as well as a greater return to counties. Therefore, Alternative 4 would provide a greater overall benefit for the local communities than Alternative 2.

3.2.3.3 Past, Present, and Reasonably Foreseeable Future Actions

Past Actions

The timber program on the Ottawa National Forest is relatively stable. The Forest has been receiving a fairly steady amount of monies overall during the past three years, with an average of approximately $5.4 million annually (FY 2001 M&E Report, revised June 2003, Table II.60, page 169).

Present Actions

Present levels of harvest are similar to what they were in past years, and they are not expected to change dramatically in years to come. A relatively constant output of timber products would result in relatively constant social/economic effects.

Reasonably Foreseeable Future Actions

As described above, social/economics are tied closely with the harvest of timber. Since implementation of the Forest Plan the timber program on the Ottawa has been relatively stable and the Forest has been receiving a fairly steady amount of monies. As long as the harvest level continues at its current level or is moderately increased, which would ultimately and cumulatively involve implementation of one of the action alternatives, social/economics is not expected to change substantially from the current conditions.

3.2.3.4 Cumulative Effects on Social/Economics of All Alternatives

Alternative 1

No action in the project area would not help to moderately increase or sustain timber harvest from past and present levels. This could cumulatively and negatively impact the Forest's ability to help meet an increasing demand for timber products, and would not help to support timber-related jobs and associated income and taxes generated from that income. It could also contribute to a reduction in timber sale receipts across the Forest that otherwise would be applied to the 25% Fund.

Over time the value of the timber products in the project area is likely to decrease because stands would continue to age and become prone to insects and disease if they are not treated. Not treating over-crowded stands would likely result in reduced growth and product value as well.

The ability to provide a sustained flow of certain forest products such as aspen would likely decrease over time because no treatment would allow these stands to convert

to other forest types. This would also result in a reduction of early successional habitat for game species such as white-tail deer and ruffed grouse, which could cause a decline in their population numbers and ultimately affect the number of hunters visiting the local area who contribute to the local economy.

Alternatives 2-4

Implementation of an action alternative would contribute to a sustained or increased amount of timber harvest across the Forest that would help meet an increasing demand for timber products. This would also provide a continuation of timber sale receipts for the 25% Fund, and could help to create or sustain timber-related jobs along with their associated income and income taxes.

The value and growth of the timber products in the project area is likely to increase over time as unhealthy and over-crowded trees are removed from treated stands. A variety of forest products, as well as early successional wildlife habitat, would also be maintained, particularly from treating and maintaining aspen stands.

All of these factors can positively affect the Forest-influenced community as a whole. Providing forest products, sustaining timber-related jobs, and maintaining early successional wildlife habitat for game species would continue to provide spending dollars and income for local communities because workers, hunters, and other recreationists are likely to continue to shop, visit, and recreate in the local area.

3.3 WILDLIFE RESOURCES

The following is a summary from the wildlife report (located in the project file). This summary only discusses the effects to wildlife as they are connected to the issues or Federal rules and regulations (Endangered Species Act, National Environmental Policy Act, National Forest Management Act, etc.). Other effects are documented in the wildlife report, Biological Assessment (BA), and Biological Evaluation (BE), also located in the project file and available upon request.

3.3.1 Methodology

The landscape in the Baltimore VMP provides a diversity of habitat that supports a wide variety of wildlife species. In an effort to address this diversity, this analysis focused on key habitat processes and components, species groups, species of concern, and the potential of the proposed alternatives to affect these aspects of the wildlife community.

Topics selected for analysis are those with the greatest potential to influence wildlife populations in the project area and those for which particular concern was expressed during this project. Topics addressed in the wildlife report are as follows:

- Habitat Fragmentation
- Biodiversity
- Old Growth
- Corridors
- Aspen Management
- Snags, Cavities, and Down Woody Debris
- Neotropical Migratory Bird Species
- Threatened, Endangered, and Sensitive Species
- Management Indicator Species

Topics to be discussed in the EIS are as follows:

- Habitat Fragmentation (as it is related to aspen management)
- Biodiversity (as it is related to aspen management)
- Aspen Management
- Threatened, Endangered, and Sensitive Species
- Management Indicator Species

Definitions

Young Forest -- Forest stands ≤ 15 years of age, regardless of tree species composition.

Vertical Diversity -- Within-stand characteristics such as how many canopy layers, complexity of branch and foliage structure, density and complexity of shrub and forb layers.

Structural Diversity -- Within-stand characteristics such as quantity and arrangement of downed wood and cavity trees, diameter distributions of trees, and number of tree species.

Interior Forest -- Intact, closed canopy forest that is far from a hard edge.

3.3.1.1 Habitat Fragmentation

The distribution of open/early-seral habitat, open-canopy mid or late-seral forest, and closed-canopy mid or late-seral forests were evaluated for each alternative to facilitate analysis of habitat fragmentation and potential impacts to habitat.

Open/early seral habitat includes those aspen stands less than 25 years old or non-forest habitat such as wetlands and permanent openings.

Mature open-canopy stands were identified based on forest type, age, and knowledge of the interdisciplinary team. Quaking aspen, bigtooth aspen, paper birch, and mixed aspen stands over 60 years old were assumed to have a mature open canopy.

Mature closed-canopy stands consist of forested stands that are older than 60 years of age and are not jack pine, quaking aspen, bigtooth aspen, paper birch, and mixed aspen